

Exponential and Logarithmic Review

Use your own paper and show all your work for all problems.

1) Solve the following problems and show your work.

Example: $49^{(3/2)} = (\sqrt{49})^3 = (7)^3 = 343$

a) $36^{(-5/2)}$ b) $16^{(3/4)}$ c) $(216^{(1/6)})^{-2}$ d) $((3/4)^{-2})^{1/3}$

2) Convert each radical expression to exponential form

a) $\sqrt[4]{x}$ b) $\sqrt[5]{x^3}$ c) $(\sqrt[3]{x})^7$

3) Solve

a) $4^3 \bullet 4^{-6}$ b) $(3/4)^{-2} \bullet (16/9)^3$ c) $\frac{5^3 \bullet 5^{-5}}{(5^2)^{-3}}$

4) Write the inverse of each function

a) $3x + 5y = 21$ b) $x^2 + 2y = 3$ c) $4^x = 15$

5) Solve for x

a) $\sqrt[3]{x} = 3.1$ b) $4x^7 - 6 = -2$ c) $(27x^6)^{2/3} = 2187$
d) $10^x = 47$ e) $5^x = 625$ f) $\log_8 2 = x$ g) $\log_6 18 = x$

6) Suppose that $4^a = 5$, $5^b = 6$, $6^c = 7$, $7^d = 8$. What is $a \bullet b \bullet c \bullet d$?

7) Expand the following expressions using the properties of logarithms.

a) $\log_4 5x^3 y$

b) $\ln\left(\frac{\sqrt{3x-5}}{7}\right)$

8) Condense the following expressions using the properties of logarithms.

a) $2\ln(x+2) - \ln(x)$

b) $\frac{1}{3}[\log_2 x + \log_2 (x-4)]$

9) Solve for x.

a) $e^x = 27$

b) $3e^{2x} - 7 = 1$

c) $\ln(x) = 3$

d) $\log_5(3x-2) = \log_5(x+4)$

e) $e^{2x} - 9e^x + 14 = 0$

f) $\ln(x-3) + \ln(x+3) = 1$

10) Most cars depreciate as they get older. Suppose a car that originally cost \$14,000 loses one-fifth of its value every year.

a) What is the value of the car after two and one-half years?

b) When is the car worth half of its original value?

c) When is the car worth less than \$1,000?

11) Ice is added to a glass of water. If not stirred the water at the bottom cools according to the formula $g(x) = 23(0.94)^x$, where x is the number of minutes since the ice was added and g is the temperature in Celsius.

a) When will the temperature be 5 degrees Celsius?

b) Explain how to solve this problem graphically.

c) Explain how to solve this problem using logarithms.